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SP.235 / ESG.SP235 Chemistry of Sports
Spring 2009

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SP.235 - Chemistry of sports

Week 2

3:00 - 4:00

- On-line reading - review of Anatomy and chemistry of the body

 - Mini biochemistry course

- Injury prevention

4:00 to 5:00 - introduction to running study

Review of Last week

- Fitness tests:
 - how did it go?
 - Anything unexpected?
 - Goals for the term?

Review of Last week

- How are the workouts going?
- Who wants to go swimming this Thursday at 4 pm?
- Who wants to go spinning and/or running on Saturday at 8:30 am?

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Injury prevention

- Want to participate in an exercise program that will not leave you unable to function in your daily life
- How can we do this?

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Injury prevention

- Common sense - don't go out and run a marathon when you have not been running regularly
 - Gradually build up your level of exercise
 - Better to be consistent through out the week as opposed to doing it all on the weekend

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Injury Prevention

- Who has been injured?
- What happened?
- How long did it take to recover?
- Any suggestions on how to prevent it from happening again?

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Injury prevention at the beginning of workouts - Warm-up

- Definitions from Woods et al:
- Warm-up is intended to improve a muscle's dynamics and prepare the athlete for demands of exercise
- Do you need to do this for your specific athletic pursuit?

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Injury prevention at the beginning of workouts - Stretching

- Definitions from Woods et al:
- Variations of stretching - dynamic, static and proprioceptive neuromuscular facilitation (PNF)
- PNF - requires static stretch, isometric contraction and relaxation and then another static stretch

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Summary of literature

Survey of stretching protocols and results

Study	Protocol	Type	Results
Amako et al.	4 upper body, 7 lower body, 7 trunk; 30 sec each 1 x 20 min session/day for 12 weeks	Static	Protocol limited the amount of muscle related injury
Bixler and Jones	Trunk twist: 15 sec Hamstring, groin, quad stretches: 25 sec each	Static	Protocol reduced injury
de Weijer et al.	Hamstring only 1 x 30 sec for each leg 3 reps with 10 sec rest between reps	Static	N/A: measured changes in hamstring length over time
Hartig and Henderson	Hamstring only 5 x 30 sec stretches 3 sessions/day for 13 weeks	Static	Protocol reduced lower extremity overuse injury
Pope et al.	1 x 20 sec stretch for each of 6 major lower-limb muscle groups 1 session/day for 12 weeks	Static	Protocol did not significantly reduce total injuries
Rosenbaum and Hennig	2 lower-leg stretches 30 sec each, 3 reps	Static	N/A: measured changes in force output and muscle compliance
Sullivan et al.	Hamstring only 30 sec total (5 sec for each phase) 1 x 5 min session/day, 4 days/week, for 2 week period	Static and PNF CRC	N/A: measured changes in flexibility
Verrall et al.	Hamstring stretches 15 sec each with knee in 0, 10, and 90° of flexion, utilizing trunk flexion to enhance stretch	Passive	Protocol resulted in significant reduction in injury

CRC = contract - relax - contract; N/A = not applicable (did not specifically examine injury effects); PNF = proprioceptive neuromuscular facilitation; reps = repetitions.

Source: Woods, K., P. Bishop, and E. Jones. "Warm-up and Stretching in the Prevention of Muscular Injury." *Sports Medicine* 37, no. 12 (2007): 1089-1099.

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Injury

- Classified into groups:

- Bone injuries
- Muscle/tendon injuries
- Ligament injuries
- Spinal injuries

How long does it take to recover from injuries?

Prevention of Injuries

- How can we prevent injuries?
- Does warm-up help?
- When do you stretch - before or after workout?
- What happens when you don't stretch?
- Is it sport specific?

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Protecting yourself when you workout

- Equipment for Triathlons
 - Swimming
 - Bike
 - Running
- Sport specific equipment?
- What equipment do you use for your sport?

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Steve's show and tell

- Crash - Memorial day 2008!

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Rest of class

- Talk about the Newton running shoe study (unofficially - still waiting for human subject testing approval)
- For next week:
- Training your body - scientific approach

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Newton Running Shoe Study

- COUHES approval pending - so can't start it until after Feb. 14th
- Description of the study - see handout
- Not doing the study will not affect your getting your P in SP.235 - it is for extra PE points

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Organization of running study

- Run three times a week;
 - Supervised by Ryan Jackson, Christopher Carper, Melissa Gymrek, Racz Rastislav
 - Times for running?
 - Entering the data via the website:
<http://www.mynewtonstudy.com/>
- Participants will log on via their email name.

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Organization of running study

- If you are interested in doing the running study, please come and talk to Patti and Steve at the end of class